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THE CONSTRUCTION OF MEANING IN DESIGN-DRIVEN PROJECTS

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Abstract: The cornerstone in design-driven innovation is the creation of new meanings – the creation of a holistic, creative result meaningful to its users. However, despite an increasing interest in this field, the process of how meaning is constructed is still a neglected area in design and innovation management research. This paper explores how five Danish companies in diverse industries constructed new product meanings. The study indicates: that innovation of meaning starts from the designer's personal experience with a paradox in an existing product-user relationship, that a vital part of meaning construction is the user's experience of the product, and that meaning is constructed from a number of different frames.

Keywords: *design-driven innovation, meaning-making, framing*

1. Introduction

In today's world of an ever-increasing abundance of products and services, companies are challenged to find new ways to differentiate from competitors, thus they are forced to go beyond the functional features in order to win the customers hearts. The concept of design is increasingly acknowledged as a strategy to innovativeness, as a tool to rule the market competition with breakthrough ideas. Accordingly, the way designers work and think is more widely adopted by other professions, by non-designers, as a way to manage the development processes of new products and services. Meaning is the core of design, and the designer's work is therefore a matter of creating this meaning. Also Verganti adopts this definition of design when he introduces the term of 'design-driven innovation' as a way to make radical change in a socio-cultural context by making radical change of meanings (Verganti, 2009). In recent years, the study of meaning in design draws upon the idea that products do not stand in their own right, rather they are extracted as meaningful signs or symbols. From a communicative perspective, it is the *information* extracted from the product which is the central point, not the product per se. Products are what they *communicate* they are. Therefore, in the design process, meaning is a balance of what the designer constructs and what the user receives. Kazmierczak (2003) distinguishes between four different kinds of meaning: intended, constructed, received and re-constructed meaning (Kazmierczak, 2003). The designer aspires an *intended* meaning, which is *constructed* through an artifact *received* by the user, who *reconstructs* the intended meaning. The ideal scenario is that these four meanings should be the similar, if not the same, which is also the point of Krippendorff's definition of 'second-order understanding' (Krippendorff, 2006). In this perspective,

the core of designing is construction of meaning, and the product is seen as the medium to communicate the meaning (Krippendorff, 2006).

In spite of an increasing interest in design-driven innovation, the topic is still limited in existing literature. A few studies point to the concept; e.g. Öberg (2015) explored the characteristics of design-driven innovation in organizations, i.e. within the field of innovation management, and Rampino (2011) investigated the design-driven process as a result of different levers of innovation. Most design literature addresses meaning *receiving* (e.g. Crilly, 2011; Desmet & Hekkert, 2007; Norman, 2004) that means how people experience the intended meaning of products by which the *construction* of meaning is rarely addressed on an operational level. Our study aims to increase the understanding of design-driven innovation and its characteristics from a team level perspective. More specifically, it will explore how new meanings emerge in the design process through the concept of framing.

2. Construction of product meaning

Innovation literature states that innovation of new meaning starts from a vision (e.g. Magnusson & Nilsson, 2011; Sarpong & MacLean, 2012; Verganti, 2016). Correspondingly, Hekkert and Dijk (2011) describes designing as visioning process on 3 interdependent levels: a product level, an interaction level and a context level (Fig. 1).

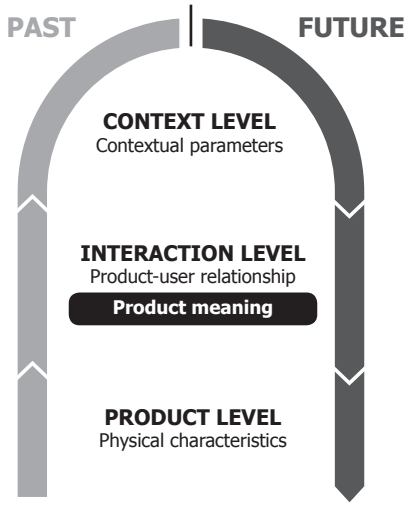

Fig. 1. Product meaning defined from 3 interdependent levels (based on Hekkert and Dijk, 2011 p. 119)

As depicted in the model, the product meaning relates to the interaction level and is defined by the product-user relationship. Hence, product meaning is only present in relation to people, i.e. when it is seen, used, interpreted and processed by people (Hekkert & Dijk, 2011) and as a consequence, meaning is not a static concept. How people receive meaning is constantly changeable because we are constantly influenced by our social environment, we interact within the world of which make new experiences and consequently create new meanings of our surroundings. Hence, product meaning is dependent of its context and influenced by how it is communicated through its physical characteristics (product level). The model further depicts that a future vision starts from an understanding of an old version of a product and its interactions provided in a past context. In this sense, the understanding of the past becomes the starting point for envisioning a future product in a future context providing a new product meaning. All three levels have indeed an important impact in the process of meaning construction; in order to clearly communicate the intended product meaning (making intended and received meaning similar), the context and product details should be clearly linked to the interaction level in a meaningful way.

2.1 Framing as an approach to meaning construction

An important aspect of envisioning new product meaning is the concept of 'framing'. Donald Schön (1983) was the first to bring framing into the design field as a part of his work on reflective practice. Schön defined framing as *'the underlying structure of belief, perception and appreciation'* (Schön & Rein, 1994, p. 23) which allows us to 'see things as' (Schön, 1983) or to create specific object worlds (Bucciarelli, 1988). In this way, the *framing* of the situation determines a direction of further moves in the process. Dorst (2011) defined the notion of a frame as the designer's way to tackle 'wicked problems'. In his model (Dorst, 2011), Dorst showed that when designers work with a wicked problem, which is complex and ambiguous by nature (Buchanan, 1992) and thus not possible to define upfront *'what'* they are designing or *'how'* the solution should work, the designers create a frame (Fig. 2).

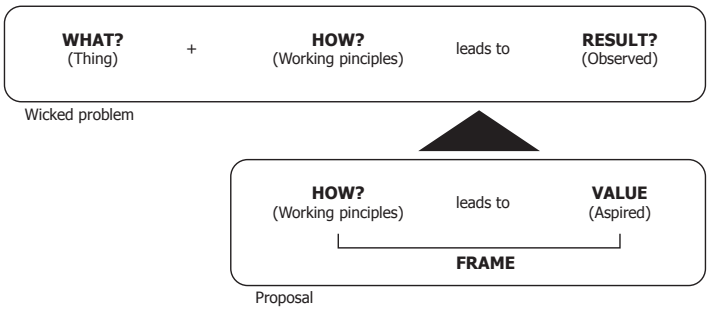

Fig. 2. Dorst's definition of a frame – as a proposal to a wicked problem (based on Dorst, 2011 p. 523-524)

The frame serves as a working hypothesis for how the solution should work in order to achieve an aspired value (*'why'*). In this way, the designer creates both a new way of understanding the problem as well as a new way of acting within this problem in order to construct a new meaning. Dorst calls this approach 'Frame Creation' (Dorst, 2015) which allows radical innovation of meaning. His work is an important contribution to framing theory to understand how designers work so as he showed that the framing process plays a crucial role in meaning construction in order to manage the ambiguity of today's design problems.

3. Methodology

This study includes a series of 5 semi-structured interviews with designers in different Danish companies based on 5 products that are now on the market. All cases are categorised as design-driven projects based on their approach to differentiate from the market with a new product meaning. The interviews are based on open-ended questions with the aim to understand the underlying reasoning of the product by questioning the physical details to gain insight about intentions, decisions, and challenges met in the process. Each case is analysed in respect to Dorst's model (2011) to understand how physical properties are linked to aspired values. Furthermore, Hekkert & Dijk's model (2011) is used to analyse the link between the levels (Fig. 1), e.g. how contextual parameters influenced strategic decisions in respect to the intended product meaning. In the following section, each product case will be introduced.

3.1 The cases

Butchers & Bicycles: MK1-E (cargo bike)

Butchers & Bicycles developed a cargo bike with the aim of providing a joyful driving experience for families with young children. The initial idea was to create "the Tesla of electric bikes" - an urban bike replacement of the car with security for the children combined with an experience of flow and speed from the regular urban bike. References from the car are articulated in the details, e.g. a cup holder and glove compartment and every step of use is carefully considered: it is easy to park, stable when parked, children can walk in themselves, and maintaining is minimal (puncture free tyres, belt drive, drain holes, etc.). It should stand the daily (mis)use of bicycles and expand the longevity of

regular bikes. MK1-E kick-started the success of Butchers & Bicycles as a well-established company, today positioned as the high-quality cargo bike in the big cities.

Libratone: Live (airplay music system)
Libratone Live entered the market with a new airplay music system, integrated with a new technology never seen in a music system before: a 360 degrees' sound experience (FullRoom™). Accordingly, the aim was to get away from the bulky black electronic/PC reference and into a 'home' reference, appealing to both males and females. Live settled the brand of Libratone and became a great sales success with its wireless Fullroom™ technology, its triangular shape articulating different sound directions, balanced by a wool covering expressing the home environment, and the possibility to bring it anywhere – as a soundtrack to the daily activities.

B&O Play: Beoplay A9 (airplay music system)
Beoplay A9 broke with the archetype of loudspeakers and docking stations by making a music system into an experience of a designer chair fitting the living room in young people's homes. The aim was to introduce products of B&O to a new target group and make them future B&O customers. A9 was an important step in this process as it contributed to the settling of the new sub-brand B&O Play into the market landscape of music systems, targeted towards the younger generation with a playful experience where you fill the room with music in no time, just by stroking it.

Vipp: Vipp Kitchen
The idea about the Vipp Kitchen started from the company's famous product: the Vipp pedal bin, developed in 1939, which established the brand identity of Vipp and is still sold today. The pedal bin is seen as a strong design icon and known for its extensive longevity due to its timeless expression and high-quality construction. The intension was to extend the brand values from the pedal bin into a kitchen and use it as their own retail stores for the bin together with whole Vipp assortment. The strategy was a big step for the company as they had neither any experience with kitchen development nor had they made this scale of products before. Making a kitchen for the bin was seen as a bit 'naughty' strategy, nevertheless it received a lot of attention and even about 40 % of the customers invested in the kitchens without having seen it before, solely based on their loyalty to the brand created from the pedal bin.

Coloplast: SenSura Mio (ostomy bag)
Coloplast is a company developing healthcare products, mainly in the category of ostomy-, urology-, wound- and skin care. The main intension was to change the paradigm of ostomy bags and medico products in general into 'lifestyle aesthetics' where the patient is not stigmatised as a sick person but rather seen as a 'consumer'. SenSura Mio is an ostomy bag in woven fabric material (instead of plastic), which feels comfortable and natural to the skin. Its warm grey colour is based upon similarities between different skin tones and aligned with the back shadow on skin, which makes it perfectly discrete under fair clothing. The discrete brand colours indicate interaction touchpoints making use as intuitive as possible. SenSura Mio created a new meaning of the ostomy bag which characterises the core of Coloplast's design DNA today throughout their product portfolio.

4.0 Results and findings

So how did the companies manage to construct this new meaning to the users? The initial findings presented in the following are supported by examples from the cases based on the analysis of data from the interviews.

4.1 Innovation of meaning is initiated by a paradox in an existing product-user relationship

As already stated, innovation of meaning starts from a vision. But what underlies the creation of a vision? How does it emerge? Referring to the 3 levels of visioning in design (Fig. 1), a pattern seemed to appear across the 5 cases: the designers used their own meaning receiving from an existing product to initiate a future vision. They discovered a paradox in an (existing) product-user relationship. In

most cases, the identified paradox was caused by changes in the context, e.g. related to social behaviour. Or in other words: an existing frame describing an existing product meaning revealed conflicting values (paradox) caused by changes on the context level (Fig. 3). This identified paradox initiates a future frame including the aspired value for the future product. These findings will be exemplified in the following along with how they managed to solve the identified contradictions in the user experience.

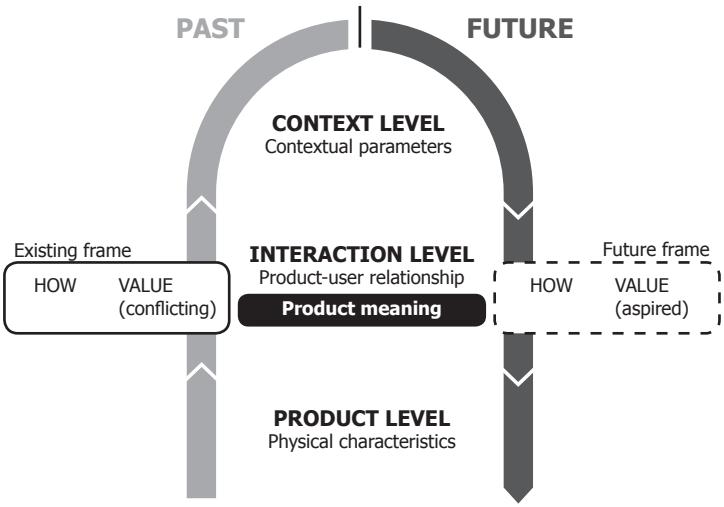

Fig. 3 An existing frame (derived from a past experience) initiates the future frame

In the case of Butchers & Bicycles, the designers found the existing cargo bikes in Copenhagen inconvenient and annoying for other cyclists due to their low speed and big volume. Nevertheless, cargo bikes were increasingly popular but mainly used for short rides and for practical reasons: to transport children and goods. The user experience seemed neglected and the car is the only alternative to respond these needs. But choice of a car is not consistent to an increasing general awareness to a cleaner environment and sustainable living (context level) by which the designers' vision was initiated: Butchers & Bicycles would create a new meaning of the traditional cargo bike; they envisioned to create 'the Tesla of electric bikes'. In the design process, the user experience was prioritised as the most important aspect. The driving experience should be like *'a 3-wheeler driving like a 2-wheeler'* which became the leading reference for the design team. They developed a new technology applied onto the front wheels (Built-to-tilt™) making it possible to lean in the curves and thus create the ride on a cargo bike into a joyful experience. The driving experience was further supported by a forward leaning position like on a mountain bike, and an electric motor enables to follow the flow on the cycle paths - or even pass other 2-wheelers.

In the Libratone case, the designers found that existing loudspeakers often ended up in the basement due to their 'bulky and black' expression, which did not appeal to 'the lady of the house' and did not fit the living room interior. Moreover, the designers had discovered that the way people listen to music had changed. At that time, people increasingly used portable devices for storing and assessing music and consequently, the market of docking stations was rising but the sound quality and performance was seen as very poor. This paradox in the product-user relationship, initiated by changes on a context level, established Libratone's vision: they would disrupt the market with a sound system created 'as a piece of furniture' attractive for both males and females and integrated with a unique sound quality. The development of Libratone Live was driven by solving the contradictions in the user experience: They aspired to create the sound experience *'as an acoustic guitar'*, together with the expression of *'balancing the bold and discrete'* emphasising the unisex aspect. These references led to the physical characteristics of the triangular shape (articulating the sound in multiple directions) and the soft wool cover (balancing the bold shape).

In the case of Coloplast, the paradox also derived from the designer's personal involvement: the designer was a relative to an ostomy patient. When the designer's relative had the information that she was obliged to get an ostomy, she uttered that she would rather die than getting an ostomy bag. Accordingly, the designer realised that existing ostomy bags on the market were targeted as body-worn aids for sick people. This insight triggered the vision for the designer: her relative was either not sick or handicapped, thus should ostomy bags not stigmatise these people within this category. People with ostomies should feel dignified and continue their lives in the same way as before surgery. Coloplast's vision was therefore to make an ostomy bag that radiates an everyday product instead of in the category of medico products. The intention was to make a future product-user relationship like *'just as a piece of clothing'* which served as the most important reference for decisions made in the process, e.g. how it should feel to the skin (fabric material), how to put it on (easy interactions) and how to wear it unworried about the safety.

The designer at Vipp found that existing kitchens generally were categorised within the 'fashion industry' following the market trends of colours and materials by which they were typically outdated after 7-10 years. At that time, the iconic Vipp pedal bins (designed in 1939) were sold as a piece of accessory to these kitchens, however the designer was not satisfied with this arrangement. Firstly, because the kitchens did not represent the same values as the bin and secondly, because the retailers did not sell the whole Vipp assortment. Based on these contradicting values, the idea came to make their own kitchens, independent of market trends, and additionally use them as retail stores for all Vipp products. Vipp's vision was to create *'a kitchen to go with the bin'* providing the full-scale version of the pedal bin experience. It should represent the values created from the bin, from details and expression to materials and quality and it should articulate its extensive longevity and differentiate from the market of fashion kitchens.

In the new strategy at B&O, they wanted to introduce B&O products to the younger generation and make them the future B&O customers. However, the designer realised that the traditional core values of (existing) B&O products did not respond to young people's preferences and behaviour today. For instance, the great installation of traditional B&O products into the house were less attractive for young people as their type of living had become less static than previously, they move from apartment to apartment. In other words, changes in the context initiated the vision of the future product-user relationship; B&O would create an experience of a music system *'like a designer chair,* referring both to the product expression and the interactions, a chair can be easily repositioned. The user experience was the most important to achieve to differentiate from the market where docking stations are dominating at that time. A designer chair is *'not a podium for another product. You do not place an iPhone onto it. It is supposed to be a product per se – as a chair'*, the designer states. In this way, B&O initiated a new product-user relationship for a music system, linking to the changed context of young people today.

Referring to the model by Dorst (fig. 2), the designers create a *frame* as a proposal for a new intended meaning: they aspire a vision and propose concrete solution principles for how to achieve it. This frame is communicated through a metaphor and deals with the user experience, prioritised as the most important aspect in the process of meaning construction.

4.2 Meaning construction consists of various frames

In order to strengthen the new intended product-user relationship, we see a pattern that additional frames are created in the design process. They describe interrelated factors that all together should communicate the intended product meaning to the user. In our cases, the additional frames deal with perspectives like e.g. expression, business, and technology.

In the Vipp case, the frame of *'A kitchen to go with the bin'* defined the main vision for the project. In order to manage the design process, the team creates of a number of frames, each from a certain perspective. For instance, one purpose is to create a product that is not fashion- or trend dependent,

which addresses the expression of the product. The common frame created of this purpose is *'like the black trench coat'* – it will never be outdated. To achieve this purpose, the kitchen is made only in a black and a white version. Another purpose is to reduce the complexity of buying a kitchen, helping the customer to faster decisions and provide a smoother buying process (compared to other kitchens). So, from this user perspective, the common frame is a kitchen with *"Ford T type choices"*, indicating a minimal level of customization, e.g. the only variable of the kitchen is the length, and the choice of induction or gas cooker. Every other appliance is pre-chosen. In the same way, additional frames are created, which is illustrated in fig. 3.

Perspective	Purpose/vision	Frame/metaphor	Solution principle
User experience (main vision)	To create a kitchen based on the pedal bin experience, and use it for Vipp retail stores	**'A kitchen to go with the bin'**	Adopting the design DNA from the pedal bin into the kitchen
Expression	To make a product that is not fashion- or trend dependent	**'Like the black trench coat'**	Only black and white versions.
User	To reduce complexity in the buying situation, helping the customer to faster decisions	**'Ford T type choices'**	The only viable is the length and choice of induction or gas cooker. 3 standard modules.
Functionality	The kitchen is supposed to be used and customers are supposed to love to use it.	**'It's a tool'**	Standing on feet (cleaning underneath), industrial references, machine-like feel
User interactions/ experience	To create a wow-factor when you feel it, put experience into interactions	**'Like when a BMW door is closing'**	Attention to details, weight, sounds, tactile feel at interaction touchpoints.

Figure 3. An example of frames created in the Vipp case

Another example is in the B&O case where more frames are added as well to define the full product meaning. Firstly, the product should 'invite' for user interactions; it should be easy to fill the room with music in no time and it should be playful for the target group to master. A common frame of *'playability'* leads to a solution where strokes and gesticulations control the music instead of a remote. Secondly, the product should represent the traditional B&O core values of *'craftsmanship'* (brand perspective), which is indicated through the detailing level and quality of materials. Lastly, the product should represent music, by which a common frame of *'the large tuba'* (expression perspective) is created, articulated through the big round shape of the speaker unit.

In another example from the case of Coloplast, an additional frame to the user experience is *'safety first'* which is derived from a technology perspective. In order to retain the user's feeling of dignity (the vision), it is crucial that the user feels safe, i.e. there should be no leakage of fluid or smell from the bag. Furthermore, the product should be recognisable as a Coloplast product (brand perspective), e.g. through the brand colours and discrete expression. The brand perspective is overlapping with the perspective of user interactions where physical touchpoints are emphasised through the brand colours. In the same way, a number of frames are also present in the case of Butchers & Bicycles and Libratone, reflecting the products' business, technology, expression, user interactions, and so forth, ensuring that every detail of the product has an explicit purpose that supports the main vision.

5. Conclusion and discussion

Design-driven innovation is of increasing interest in industry but in design research the topic is relatively new and it rarely addresses the operational activities in the design team. Our preliminary study aims to contribute to this level by which we see a great potential in framing as a key to explore the construction of new meanings in design teams. In this paper, we have presented our preliminary findings of how meaning is constructed in 5 design-driven projects. The study indicates that meaning construction lies upon a successful framing process where a number of frames are created. The

creation of frames derives from diverse knowledge and generation of new insights and in the process, they serve as criteria and common guidelines for the intended meaning to achieve. In summary, we have indicated that innovation of meaning starts from a paradox discovered by the designer in an existing product-user relationship. This paradox initiates the main vision for the project, communicated through a frame, which addresses the intended user experience. From this point, additional frames are made explicit and together they define the solution space for the aspired meaning and additionally guide strategic decisions in the design process.

This study is only to be seen as the first initial implications by which empirical evidence is necessary in order to identify clear patterns of the meaning construction process. Further research through several case studies should further explore the phenomena and thus increase the understanding of meaning construction in design teams. Real-time data may provide a richer description of the phenomena as we can follow how frames emerge, how they are reflected, negotiated and determined, and how they possibly change in the process. The aim of further research is thus to identify how we can manage and support the meaning construction process on an operational level in order to provide new meaningful products to people in the future.

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